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TEST REPORT ON M20 GRADE CONCRETE

NAME OF WORK: Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Bhavi Muneshwara Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Size of cubes : 150 x150 x 150 mm

Cross Sectional area : 22500 mm2

Grade of concrete : M20

Compressive Strength as on : 28 Days

Sl no	Date of casting	Date of testing	Failure load	Compressive Strength (N/mm2)	Average Compressive Strength (N/mm2)
1	30-11-2018	28-12-2018	483	21.44	
2	30-11-2018	28-12-2018	486	21.58	21.59
3	30-11-2018	28-12-2018	490	21.77	

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Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P., Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

GRADIATION FOR WMM

MORTH TABLE – 400 - 11

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains Bhavi muneshwara temple main road and saround areas Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing 18-10-2018

IS Sieve Size in mm	Weight Retained (gms)	Cumulative Weight Retained (gms)	Cumulative % of Retained	Cumulative % of Passing	Specific Limits
53	0	0	0	100	100
45	275	275	3.1	96.9	95-100
22.4	2665	2940	33.3	66.7	60-80
11.2	1345	4285	48.5	51.5	40-60
4.75	1290	5575	63.1	36.9	25-40
2.36	1025	6600	74.7	25.3	15-30
0.600	965	7565	85.6	14.4	8-22
0.075	940	8505	96.2	3.8	0-8

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Consulting Engineers Bangalore

Assistant Executive Engineer.
Kodigehalli Sub Division.
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

Aggregate Impact Value (W.M.M.)

IS : 2386 Part IV

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains at Bhavi muneshwara Temple main roas and arounding areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing 18-10-2018

Sl. No	Details	Trial No.		Average
		1	2	
1	Total Weight of aggregate sample filling the cylindrical measure = W_1 g	388	387	
2	Weight of aggregate passing throw 2.36 mm IS sieve after the test = W_2 g	89	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	358	
4	Aggregate Impact value = percent fine	22.94	22.73	22.83
	$100*(W_2/W_1)\%$			

Comments:

- **Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%.**

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Assistant Executive Engineer, Kodigehalli Sub Division, B.B.M.P. Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

Determination of Flakiness Index & Elongation Index of Coarse Aggregate.

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains at at Bhavi muneshwara Temple main roas and arounding areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 18-10-2018

Result : Flakiness Index = 11.58%.

Elongation Index = 13.58%.

Result: Combined Flakiness & Elongation Index = 25.16%.

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%.

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TEST FOR BITUMEN SAMPLE USING FOR DENSE GRADED BITUMINOUS CONCRETE

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround area inWard No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

The results of the tests conducted on the Bitumen sample using for Bituminous Concrete

SL. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS : 1203 – 1978 (RA-2009)	69	60 to 70
2	Softening point, °C	IS : 1203 – 1978 (RA-2009)	51	Min. 45
3	Ductility at 27°C, cm	IS : 1203 – 1978 (RA-2009)	100 >	Min. 50
4	Flash Point, °C	IS : 1203 – 1978 (RA-2009)	286	Min. 220

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Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore.

AGGREGATE IMPACT VALUE
IS:2386 Part IV

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround area inWard No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

Sl. No	Details	Trial No.		Average
		1	2	
1	Total Weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of aggregate passing throw 2.36 mm IS sieve after the test = W_2 g	85	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	306	
4	Aggregate Impact value = percent fine	22.14	21.50	
	$100*(W_2/W_1)$%			21.82

Comments: Maximum allowable Aggregate Impact Value for Dense Graded Bituminous Macadam is 27%

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P., Bangalore.

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Survey and Engineering Project Consultants

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

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Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing 19-10-2018

Result: Flakiness Index = . **11.95 %**
Elongation Index = **13.20 %**

Result: Combined Flakiness & Elongation Index = 25.15 %

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%.

Note:

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Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

STRIPPING VALUE OF ROAD AGGREGATES (STATIC IMMERSION TEST)

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround area inWard No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

Type of Binder	: 60/70
Percentage of Binder used	: 5.0% by wt.
Total weight of aggregate	: 200 g
Total weight of Binder	: 10.00 g
Temperature of water-bath	: 40°C

Observation Number	Stripping Percentage	Average, Percentage	Average Retained Coating, %
1	3.0		
2	2.9		
3	3.2	3.0	96.97

Comments:

Maximum allowable aggregate retained coating for Dense Graded Bituminous Macadam is 95%

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Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

SPECIFIC GRAVITY AND WATER ABSORPTION TEST

IS : 2386 Part III

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround area inWard No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

SL. No	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2014	2013	2012	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1-W_2)=W_s$g	1264	1263	1262	
4	Weight of saturated surface dry aggregate in air	W_3g	2018	2022	2024	
5	Weight of water equal to the volume of the aggregate	(W_3-W_s)g	754	759	762	
6	Weight of oven dried aggregate	W_4g	2003	2006	2008	
7	Specific Gravity	$W_4/(W_3-W_s)$	2.656	2.643	2.635	2.645
8	Apparent Specific gravity	$W_4/(W_4-W_s)$	2.710	2.700	2.692	2.701
9	Water Absorption	((W3-W4)*100)/W4	0.75%	0.80 %	0.80 %	0.781%

Comments:

Maximum allowable aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%

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Consulting Engineers Bangalore BVH

Assistant Executive Engineer, Kodigehalli Sub Division, Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

BITUMEN DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX As per IRC :SP: 11-1984

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

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Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

BITUMEN DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test , g	500	500
2. Weight of Mixture after Test, g	477.5	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.5	23.00
7. Bitumen content in %	4.50	4.60
8. Average	4.55	

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Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX As per IS : SP : 2386 and IRC : SP : 11 - 1984

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

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Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

GRADATION AFTER EXTRACTION

TRAIL 1

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Specification Limits as per MORTH specification table 500-10(Grading-2)
37.5	0	0	0	100	100
26.5	39.58	8.29	8.29	91.71	90 - 100
19	82.36	17.25	25.54	74.46	71 - 95
13.2	70.67	14.80	40.34	59.96	56 - 80
4.75	95.58	20.02	60.35	39.65	38 - 54
2.36	45.85	9.60	69.96	30.04	28 - 42
0.3	75.97	15.91	85.87	14.13	7 – 21
0.075	122.53	25.66	95.62	4.38	2 - 8

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Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore.

TRAIL 2

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Specification Limits as per MORTH specification table 500-10(Grading-2)
37.5	0	0	0	100	100
26.5	36.42	7.60	7.60	92.40	90 - 100
19	89.46	18.75	26.35	73.65	71 - 95
13.2	78.65	16.49	42.84	57.16	56 - 80
4.75	82.96	17.39	60.23	39.77	38 - 54
2.36	43.63	9.15	69.38	30.62	28 - 42
0.3	80.87	16.95	86.33	13.67	7 – 21
0.075	117.56	24.65	94.03	5.97	2 - 8

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Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers
Survey and Engineering Project Consultants

AGGREGATE GRADATION TEST OF DENSE GRADED BITUMINOUS MACADAM MIX As per IS : SP : 2386 PART 1

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

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Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

Total Weight of Sample

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Grade –II As per MORTH	Remarks
37.5	0	0.0	0	100	100	Gradation
26.5	895	6.2	6.24	93.76	90 - 100	Satisfies grade II MORTH specification
19	2126	14.8	21.06	78.94	71 - 95	
13.2	2185	15.2	36.29	63.71	56 - 80	
4.75	2894	20.2	56.47	43.53	38 - 54	
2.36	1853	12.9	69.38	30.62	28 - 42	
0.3	2451	17.1	86.47	13.53	7 – 21	
0.075	1257	8.8	95.23	4.77	2 - 8	

B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Grade –II As per MORTH	Remarks
37.5	0	0.0	0	100	100	Gradation Satisfies grade II MORTH specification
26.5	798	5.5	5.53	94.47	90 - 100	
19	2235	15.5	21.03	78.97	71 - 95	
13.2	2145	14.9	35.90	64.10	56 - 80	
4.75	2156	14.9	50.84	49.16	38 - 54	
2.36	1663	11.5	62.37	37.63	28 - 42	
0.3	2785	19.3	81.68	18.32	7 – 21	
0.075	1675	11.6	93.29	6.71	2 - 8	

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B.V.H. Consulting Engineers Bangalore

HOD

Assistant Executive Engineer,
Kodisehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

B V H Consulting Engineers

Survey and Engineering Project Consultants

TEST REPORT ON STABILITY OF MIX

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

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Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 19-10-2018

The results of the tests conducted on the bituminous concrete mix sample are as follows:

SL. NO	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, Kn	9.25	9.5	9 Kn (min)
2	Marshal flow, mm	2.6	3.25	2 – 4
3	Percentage air voids in Minerals Aggregates	3.55	4.3	3 – 6
4	Void in Compacted Mix	11.9	12.45	11 – 13
5	Percent Void filled with Bitumen	66.35	68.1	65 - 75
6	Density, g/cc	2.27	2.26	--

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B.V.H. Consulting Bangalore.

Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P., Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers

Survey and Engineering Project Consultants

TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Bhavi muneshwara temple main road and saround areas in Ward No 08 Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 05-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

Note:

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B.V.H. Consulting Engg. Bangalore

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#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers

Survey and Engineering Project Consultants

BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround area inWard No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 07-11-2018

Tests on Dense graded Bituminous Macadam				
Test No 1			**Test Time :**	**11.45 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	476	24	4.8
2	500	476	24	4.8
Test No 2			**Test Time : 3.35 PM**	
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	477.5	23.5	4.7
2	500	477.5	23.5	4.7

Note:

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2. The results indicated above are based on the tests carried out on the samples received in the laboratory and the test carried out at the site.

3. Any Query regarding the report must be within 30 days from the date of testing.

B.V.H Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at at Bhavi muneshwara temple main road and saround areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 14-11-2018,15-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround areas Ward in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 14-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**10.25 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	472.5	27.5	5.5
2	500	473	27	5.4
Test No 2			**Test Time :**	**2.25 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	474	26	5.4
2	500	474	26	5.4

Note :

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#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Drains Bhavi muneshwara temple main road and saround areas Ward in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing 15-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**11.5 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**04.20 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

Note :

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B.V.H. Consulting E... Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P. Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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GRADIATION FOR WMM

MORTH TABLE – 400 - 11

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 25-10-2018

IS Sieve Size in mm	Weight Retained (gms)	Cumulative Weight Retained (gms)	Cumulative % of Retained	Cumulative % of Passing	Specific Limits
53	0	0	0	100	100
45	275	275	3.1	96.9	95-100
22.4	2665	2940	33.3	66.7	60-80
11.2	1345	4285	48.5	51.5	40-60
4.75	1290	5575	63.1	36.9	25-40
2.36	1025	6600	74.7	25.3	15-30
0.600	965	7565	85.6	14.4	8-22
0.075	940	8505	96.2	3.8	0-8

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Aggregate Impact Value (W.M.M.)

IS : 2386 Part IV

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 25-10-2018

Sl. No	Details	Trial No.		Average
		1	2	
1	Total Weight of aggregate sample filling the cylindrical measure = W_1 g	388	385	
2	Weight of aggregate passing throw 2.36 mm IS sieve after the test = W_2 g	89	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	358	
4	Aggregate Impact value = percent fine	22.94	22.34	22.64
	$100*(W_2/W_1)\%$			

Comments:

- **Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%.**

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Determination of Flakiness Index & Elongation Index of Coarse Aggregate.

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : **25-10-2018**

Result : Flakiness Index = 11.58%.

Elongation Index = 13.58%.

Result: Combined Flakiness & Elongation Index = 25.16%.

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%.

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 07-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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Yelahanka Zone, B.B.M.P.
Bangalore.

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TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency: Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 07-11-2018

Determination	Unit	Trial no.	
Size of tray in (sqm)		0.45x0.45	0.45x0.45
Area of tray (a)	Sqm	0.2025	0.2025
Initial Wt of empty tray(b)	Kg	1.625	1.627
Final Wt of tray with prime coat (c)	Kg	1.763	1.756
Weight of Prime coat (d=c-b)	Kg	0.1380	0.1290
Rate of Spray of prime coat	Kg/Sqm	0.681	0.637
Average	Kg/Sqm	0.659	
Specified Limit	Kg/Sqm	0.60 Kg/sqm	

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Yelahanka Zone
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 12-11-2018

Prime Coat/tack Coat

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1714	1713
Weight of prime(a-b)gms	26	25
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.026/0.09=0.29 kg/sqm	0.025/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.28	

Specified rate as per Specification: 0.25 Kg/sqm

Note:

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 12-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : **Benaka Developers & Projects Pvt. Ltd.**

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 12-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**10.35 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**3.05 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

Note :

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Assistant Executive Engineer
Kodigehalli Sub Division
B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in Kannuramma Temple Main Road and Surrounding Areas in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 12-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**11.05 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**04.45 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

Note :

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Executive Engineer, Sahakara Sub Division, Sahakara Zone, B... Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST REPORT ON CEMENT

NAME OF WORK: Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 01-11-2018

SAMPLE ID : Cement (ACC 53 Grade)

PHYSICAL REQUIREMENTS :

Sl no	Description	Test Method as per IS	Test Result	Remarks
1	a) Initial setting time	IS: -4031 (part-5)	127 Minutes	OK
	b) Final setting time	IS: -4031 (part-5)	458Minutes	OK
2	Soundness	IS: 4031 (part-3) La-Chatelier method	3.0 mm	OK
3	Standard Consistency	IS: -4031 (part-4)	25.00%	OK
4	Compressive Strength			OK
	a) 3 Days	Mpa	26	OK
	b) 7 Days	Mpa	37	OK

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Assistant Executive Engineer Kodigehalli Division,

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST REPORT ON FINE AGGREGATE

NAME OF WORK: Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 01-11-2018

SAMPLE ID : Sand

Total Wt of Aggregate in gms : 1350

IS Sieve Size in mm	Weight of Retained (gms)	Cumulative Weight of Retained (gms)	Cumulative % of Retained (gms)	Cumulative % of passing	Percentage Passing for grading zone II as per IS 383-1970
10	0	0	0	100	100
4.75	30	30	2.22	97.78	90-100
2.36	62	92	6.81	93.82	75-100
1.18	90	182	13.48	86.52	55-90
600 Micron	480	662	49.03	50.97	35-59
300 Micron	358	1020	75.55	24.45	8-30
150 Micron	325	1345	99.62	0.38	0-10

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Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore-92

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST REPORT ON COARSE AGGREGATE

NAME OF WORK: Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 01-11-2018

SAMPLE ID : 20 mm Aggregate

Total Wt of Aggregate in gms : 2300

IS Sieve Size in mm	Weight of Retained (gms)	Cumulative Weight of Retained (gms)	Cumulative % of Retained (gms)	Cumulative % of passing	Percentage Passing for grading zone II as per IS 383-1970
40	0	0	0	100	100
20	195	195	8.125	91.87	95-100
10	1150	1345	56.04	43.96	25-55
4.75	955	2300	95.87	4.125	0-10

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Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka, B.B.M.P.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST REPORT ON REINFORCEMENT STEEL

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 02-11-2018

SAMPLE ID : Fe 500 TMT Steel Bars

Sl. no	Dia in MM	Weight in Kg/m	C/s area in mm2	Ultimate load in KN	Ultimate Tensile stress in N/mm2	Remarks
1	10	0.616	78.53	41.84	533	OK
2	12	0.888	113.097	61.94	548	OK
3	16	1.578	201.061	109.5	545	OK

B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST REPORT ON M20 GRADE CONCRETE

NAME OF WORK: Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Size of cubes : 150 x150 x 150 mm

Cross Sectional area : 22500 mm2

Grade of concrete : M20

Compressive Strength as on : 28 Days

Sl no	Date of casting	Date of testing	Failure load	Compressive Strength (N/mm2)	Average Compressive Strength (N/mm2)
1	07-11-2018	05-11-2018	483	21.44	
2	07-11-2018	05-11-2018	486	21.58	21.59
3	07-11-2018	05-11-2018	490	21.77	

B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST REPORT ON M20 GRADE CONCRETE

NAME OF WORK: Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Size of cubes : 150 x150 x 150 mm

Cross Sectional area : 22500 mm2

Grade of concrete : M20

Compressive Strength as on : 28 Days

Sl no	Date of casting	Date of testing	Failure load	Compressive Strength (N/mm2)	Average Compressive Strength (N/mm2)
1	28-11-2018	26-12-2018	486	21.58	
2	28-11-2018	26-12-2018	482	21.41	21.45
3	28-11-2018	26-12-2018	481	21.37	

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Assistant Executive Engineer, Kodigehalli Division, Yelahanka, B.B.M.P., Bangalore.

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Sub - Name of Work : Construction of RO water purifier plant at BB Nagar, in Ward No. 8 Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference: Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Size of cubes : 150 x150 x 150 mm

Cross Sectional area : 22500 mm2

Grade of concrete : M20

Compressive Strength as on : 28 Days

Sl no	Date of casting	Date of testing	Failure load	Compressive Strength (N/mm2)	Average Compressive Strength (N/mm2)
1	05-12-2018	02-01-2019	486	21.58	
2	05-12-2018	02-01-2019	482	21.41	21.45
3	05-12-2018	02-01-2019	481	21.37	

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Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P., Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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GRADIATION FOR WMM

MORTH TABLE – 400 - 11

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains in front of Dee EnclaveLayout in ward No 08- Kodigehalli, Kodigehalli Sub Division.

in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : . **Benaka Developers & Projects Pvt. Ltd.**

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : **29-10-2018**

IS Sieve Size in mm	Weight Retained (gms)	Cumulative Weight Retained (gms)	Cumulative % of Retained	Cumulative % of Passing	Specific Limits
53	0	0	0	100	100
45	275	275	3.1	96.9	95-100
22.4	2665	2940	33.3	66.7	60-80
11.2	1345	4285	48.5	51.5	40-60
4.75	1290	5575	63.1	36.9	25-40
2.36	1025	6600	74.7	25.3	15-30
0.600	965	7565	85.6	14.4	8-22
0.075	940	8505	96.2	3.8	0-8

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#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Aggregate Impact Value (W.M.M.)

IS : 2386 Part IV

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : : 29-10-2018

Sl. No	Details	Trial No.		Average
		1	2	
1	Total Weight of aggregate sample filling the cylindrical measure = W_1 g	388	385	
2	Weight of aggregate passing throw 2.36 mm IS sieve after the test = W_2 g	89	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	358	
4	Aggregate Impact value = percent fine	22.94	22.34	22.64
	$100*(W_2/W_1)\%$			

Comments:

- **Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%.**

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Consulting Engineers Bangalore

Assistant Executive Engineer, Kodig... Sub Division, Yelaha... B.B.M.P.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in front of Dee EnclaveLayout in ward No 08- Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : **Benaka Developers & Projects Pvt. Ltd.**

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : **20-11-2018**

Determination	Unit	Trial no.	
Size of tray in (sqm)		0.45x0.45	0.45x0.45
Area of tray (a)	Sqm	0.2025	0.2025
Initial Wt of empty tray(b)	Kg	1.625	1.627
Final Wt of tray with prime coat (c)	Kg	1.763	1.756
Weight of Prime coat (d=c-b)	Kg	0.1380	0.1290
Rate of Spray of prime coat	Kg/Sqm	0.681	0.637
Average	Kg/Sqm	0.659	
Specified Limit	Kg/Sqm	0.60 Kg/sqm	

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Assistant Executive Engineer
Kodigehalli Sub Division,

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080-23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Sub - Name of Work : Improvements to Roads and Drains in front of Dee EnclaveLayout in ward No 08- Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : **Benaka Developers & Projects Pvt. Ltd.**

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : **20-11-2018**

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains in front of Dee EnclaveLayout in ward No 08- Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 20-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR PRIME COAT

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Sub - Name of Work : Improvements to Roads and Drains in front of Dee EnclaveLayout in ward No 08- Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 20-11-2018

Determination	Unit	Trial no.	
Size of tray in (sqm)		0.45x0.45	0.45x0.45
Area of tray (a)	Sqm	0.2025	0.2025
Initial Wt of empty tray(b)	Kg	1.625	1.627
Final Wt of tray with prime coat (c)	Kg	1.763	1.756
Weight of Prime coat (d=c-b)	Kg	0.1380	0.1290
Rate of Spray of prime coat	Kg/Sqm	0.681	0.637
Average	Kg/Sqm	0.659	
Specified Limit	Kg/Sqm	0.60 Kg/sqm	

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Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 23-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

Note:

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 23-11-2018

tack Coat

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1714	1713
Weight of prime(a-b)gms	26	25
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.026/0.09=0.29 kg/sqm	0.025/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.28	

Specified rate as per Specification: 0.25 Kg/sqm

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Divisi...

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 23-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**10.10AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**2.15 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	474	27	5.4
2	500	474	27	5.4

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing 23-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**11.35 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	474	26	5.2
2	500	474	26	5.2
Test No 2			**Test Time :**	**04.20 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	474.5	25.5	5.1
2	500	474.5	25.5	5.1

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Assistant Executive Engineer
Kodigehalli Division
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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GRADIATION FOR WMM

MORTH TABLE – 400 - 11

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains at Lottegollahalli Main Road Near jalageramma templeRoad in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : **Benaka Developers & Projects Pvt. Ltd.**

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : **26-10-2018**

IS Sieve Size in mm	Weight Retained (gms)	Cumulative Weight Retained (gms)	Cumulative % of Retained	Cumulative % of Passing	Specific Limits
53	0	0	0	100	100
45	275	275	3.1	96.9	95-100
22.4	2665	2940	33.3	66.7	60-80
11.2	1345	4285	48.5	51.5	40-60
4.75	1290	5575	63.1	36.9	25-40
2.36	1025	6600	74.7	25.3	15-30
0.600	965	7565	85.6	14.4	8-22
0.075	940	8505	96.2	3.8	0-8

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080- 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

Aggregate Impact Value (W.M.M.)

IS : 2386 Part IV

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains at Lottegollahalli Main Road Near jalageramma templeRoad in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : : 26-10-2018

Sl. No	Details	Trial No.		Average
		1	2	
1	Total Weight of aggregate sample filling the cylindrical measure = W_1 g	387	385	
2	Weight of aggregate passing throw 2.36 mm IS sieve after the test = W_2 g	88	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	358	
4	Aggregate Impact value = percent fine	22.73	22.34	22.68
	$100*(W_2/W_1)\%$			

Comments:

- **Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%.**

Note:

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

Determination of Flakiness Index & Elongation Index of Coarse Aggregate.

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub-Name of road : Improvements to Roads and Drains at Lottegollahalli Main Near jalageramma templeRoad in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, No.2152/20, Defence colony, Sahakara Nagara, Bangalore-92

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 26-10-2018

Result : Flakiness Index = 11.58%.

Elongation Index = 13.58%.

Result: Combined Flakiness & Elongation Index = 25.16%.

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%.

Note:

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR BITUMEN SAMPLE USING FOR DENSE GRADED BITUMINOUS CONCRETE

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

The results of the tests conducted on the Bitumen sample using for Bituminous Concrete

SL. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS : 1203 – 1978 (RA-2009)	69	60 to 70
2	Softening point, °C	IS : 1203 – 1978 (RA-2009)	51	Min. 45
3	Ductility at 27°C, cm	IS : 1203 – 1978 (RA-2009)	100 >	Min. 50
4	Flash Point, °C	IS : 1203 – 1978 (RA-2009)	286	Min. 220

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P., Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers
Survey and Engineering Project Consultants

AGGREGATE IMPACT VALUE
IS:2386 Part IV

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

Sl. No	Details	Trial No.		Average
		1	2	
1	Total Weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of aggregate passing throw 2.36 mm IS sieve after the test = W_2 g	85	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	306	
4	Aggregate Impact value = percent fine	22.14	21.50	
	100*(W_2/W_1)%			21.82

Comments: Maximum allowable Aggregate Impact Value for Dense Graded Bituminous Macadam is 27%

Note:

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing 27-10-2018

Result: Flakiness Index = . **11.95 %**
Elongation Index = **13.20 %**

Result: Combined Flakiness & Elongation Index = 25.15 %

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%.

Note:

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer.
Kodigehalli Sub Division.
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers
Survey and Engineering Project Consultants

STRIPPING VALUE OF ROAD AGGREGATES (STATIC IMMERSION TEST)

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division **Client** : **Executive Engineer, Kcdigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

Type of Binder : 60/70

Percentage of Binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of Binder : 10.00 g
Temperature of water-bath : 40°C

Observation Number	Stripping Percentage	Average, Percentage	Average Retained Coating, %
1	3.0		
2	2.9		
3	3.2	3.0	96.97

Comments:
Maximum allowable aggregate retained coating for Dense Graded Bituminous Macadam is 95%

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Survey and Engineering Project Consultants

SPECIFIC GRAVITY AND WATER ABSORPTION TEST

IS : 2386 Part III

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

SL. No	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2014	2013	2012	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1-W_2)=W_s$g	1264	1263	1262	
4	Weight of saturated surface dry aggregate in air	W_3g	2018	2022	2024	
5	Weight of water equal to the volume of the aggregate	(W_3-W_s)g	754	759	762	
6	Weight of oven dried aggregate	W_4g	2003	2006	2008	
7	Specific Gravity	$W_4/(W_3-W_s)$	2.656	2.643	2.635	2.645
8	Apparent Specific gravity	$W_4/(W_4-W_s)$	2.710	2.700	2.692	2.701
9	Water Absorption	((W3-W4)*100)/W4	0.75%	0.80 %	0.80 %	0.781%

Comments:

Maximum allowable aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%

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B.V.H. Consulting Engineers Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

Assistant Executive Engineer
Kodigehalli Division,

B V H Consulting Engineers
Survey and Engineering Project Consultants

BITUMEN DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX As per IRC :SP: 11-1984

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

BITUMEN DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test , g	500	500
2. Weight of Mixture after Test, g	477.5	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.5	23.00
7. Bitumen content in %	4.50	4.60
8. Average	4.55	

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Survey and Engineering Project Consultants

GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX As per IS : SP : 2386 and IRC : SP : 11 - 1984

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

GRADATION AFTER EXTRACTION

TRAIL 1

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Specification Limits as per MORTH specification table 500-10(Grading-2)
37.5	0	0	0	100	100
26.5	39.58	8.29	8.29	91.71	90 - 100
19	82.36	17.25	25.54	74.46	71 - 95
13.2	70.67	14.80	40.34	59.96	56 - 80
4.75	95.58	20.02	60.35	39.65	38 - 54
2.36	45.85	9.60	69.96	30.04	28 - 42
0.3	75.97	15.91	85.87	14.13	7 – 21
0.075	122.53	25.66	95.62	4.38	2 - 8

Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone,
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TRAIL 2

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Specification Limits as per MORTH specification table 500-10(Grading-2)
37.5	0	0	0	100	100
26.5	36.42	7.60	7.60	92.40	90 - 100
19	89.46	18.75	26.35	73.65	71 - 95
13.2	78.65	16.49	42.84	57.16	56 - 80
4.75	82.96	17.39	60.23	39.77	38 - 54
2.36	43.63	9.15	69.38	30.62	28 - 42
0.3	80.87	16.95	86.33	13.67	7 – 21
0.075	117.56	24.65	94.03	5.97	2 - 8

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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Survey and Engineering Project Consultants

AGGREGATE GRADATION TEST OF DENSE GRADED BITUMINOUS MACADAM MIX As per IS : SP : 2386 PART 1

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

Total Weight of Sample

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Grade –II As per MORTH	Remarks
37.5	0	0.0	0	100	100	Gradation Satisfies grade II MORTH specification
26.5	895	6.2	6.24	93.76	90 - 100	
19	2126	14.8	21.06	78.94	71 - 95	
13.2	2185	15.2	36.29	63.71	56 - 80	
4.75	2894	20.2	56.47	43.53	38 - 54	
2.36	1853	12.9	69.38	30.62	28 - 42	
0.3	2451	17.1	86.47	13.53	7 – 21	

B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Krishnaraja Zone, B.B.M.P., Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

0.075	1257	8.8	95.23	4.77	2 - 8	

Sieve Size in mm	Weight Retained, gm	% Retained	% Cummulative Retained	% Passing	Grade –II As per MORTH	Remarks
37.5	0	0.0	0	100	100	Gradation Satisfies grade II MORTH specification
26.5	798	5.5	5.53	94.47	90 - 100	
19	2235	15.5	21.03	78.97	71 - 95	
13.2	2145	14.9	35.90	64.10	56 - 80	
4.75	2156	14.9	50.84	49.16	38 - 54	
2.36	1663	11.5	62.37	37.63	28 - 42	
0.3	2785	19.3	81.68	18.32	7 – 21	
0.075	1675	11.6	93.29	6.71	2 - 8	

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST REPORT ON STABILITY OF MIX

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 27-10-2018

The results of the tests conducted on the bituminous concrete mix sample are as follows:

SL. NO	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, Kn	9.25	9.5	9 Kn (min)
2	Marshal flow, mm	2.6	3.25	2 – 4

B V H Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka, BBMP,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

3	Percentage air voids in Minerals Aggregates	3.55	4.3	3 – 6
4	Void in Compacted Mix	11.9	12.45	11 – 13
5	Percent Void filled with Bitumen	66.35	68.1	65 - 75
6	Density, g/cc	2.27	2.26	--

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BITUMEN EXTRACTION TEST ON DBM[FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7 & 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads , Drains and Footpath to Lottegollahalli Main Road near Jalageramma Temple Road in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92.

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17Dated : 16/01/2018

Date of Testing : 11-11-2018

Tests on Dense graded Bituminous Macadam				
Test No 1			**Test Time :**	**9.35 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**

B.V.H. Consulting Engineers Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

Assistant Executive Engineer,
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

1	500	476	24	4.8
2	500	476	24	4.8
Test No 2			**Test Time : 2.15 PM**	
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	476	24	4.8
2	500	476	24	4.8

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685,
Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Road near Jalageramma Temple Road 1 in Ward No 08 Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 10-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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TEST FOR PRIME COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Road near Jalageramma Temple Road in Ward No 08 Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 10-11-2018

Determination	Unit	Trial no.	
Size of tray in (sqm)		0.45x0.45	0.45x0.45
Area of tray (a)	Sqm	0.2025	0.2025
Initial Wt of empty tray(b)	Kg	1.626	1.627
Final Wt of tray with prime coat (c)	Kg	1.762	1.754
Weight of Prime coat (d=c-b)	Kg	0.137	0.127
Rate of Spray of prime coat	Kg/Sqm	0.676	0.627
Average	Kg/Sqm	0.651	
Specified Limit	Kg/Sqm	0.60 Kg/sqm	

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.,
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 12-11-2018

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1713.75	1712.92
Weight of prime(a-b)gms	25.75	24.92
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.02575/0.09=0.28 kg/sqm	0.02492/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.275	

Specified rate as per Specification: 0.25 Kg/sqm

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Consulting Engineer Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Near jalageramma templeRoad in l in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 12-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**11.35 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**04.20 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Near jalageramma templeRoad in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 12-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**10.55 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**2.25 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

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B.V.H. Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division
Yelahanka Zone, B.B.M.P.
Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers

Survey and Engineering Project Consultants

TEST FOR TACK COAT

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Opp. RMV Cluster Apartments to Railway Gate near Vyasa School in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing: 16-11-2018

Prime Coat/tack Coat

Tray no.	1	2
Weight of the tray(b)gms	1688	1688
Weight of the tray with prime(a)gms	1714	1713
Weight of prime(a-b)gms	26	25
Tray area (sqm)	300*300=0.09sqm	300*300=0.09sqm
Rate of spray (kg/sqm)	0.026/0.09=0.29 kg/sqm	0.025/0.09=0.27 kg/sqm
Avg. Rate of spray (kg/sqm)	0.28	

Specified rate as per Specification: 0.25 Kg/sqm

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Consulting Engineers Bangalore

Assistant Executive Engineer
Kodigehalli Sub Division,
Yelahanka Zone, B.B.M.P.
Bangalore

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers

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BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Near jalageramma templeRoad in l in in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 16-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**10.25 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**03.20 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

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Consulting Engineers Bangalore

Assistant Executive Engineer,
Kodigehalli Sub Division,

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com

B V H Consulting Engineers

Survey and Engineering Project Consultants

BITUMEN EXTRACTION TEST [FIELD TEST]

NAME OF WORK : Package2 Improvements to roads and drains providing amenities construction of RO water plant Bangalore one center in ward no.7& 8 Byatarayanapura Division as per annexure Go No UDD 217 SFC 2016 Dated 28.5.2016 works Sl No for Ward No. 7 12 To 23 & Ward No. 8 24 To 32.

Sub - Name of Work : Improvements to Roads and Drains at Lottegollahalli Main Road Near jalageramma templeRoad in Ward No 08 - Kodigehalli, Kodigehalli Sub Division.

Client : **Executive Engineer, Kodigehalli Division, NO.2152/20, Defence colony, Sahakara Nagara, Bangalore-92**

Name of the Agency : Benaka Developers & Projects Pvt. Ltd.

Reference : Agreement NO.BBMP/EE/BTP/AG/007/16/000043/16-17 Dated : 16/01/2018

Date of Testing : 16-11-2018

Tests on Bituminous Concrete				
Test No 1			**Test Time :**	**10.40 AM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4
Test No 2			**Test Time :**	**03.35 PM**
Sample No	**Initial Weight of the Mix [w1], in g**	**Weight of mix after extraction of Bitumen [w2], in g**	**Difference in weight, w=[w1-w2], in g**	**Percentage of Bitumen Extracted = [(w /w1)*100]-100, in %**
1	500	473	27	5.4
2	500	473	27	5.4

Note :

1. The report shall not be reproduced, except in full, without the written approval of the laboratory.
2. The results indicated above are based on the tests carried out on the samples received in the laboratory.
3. Any Query regarding the report must be within 30 days from the date of testing.

Consulting Engineers Bangalore

Assistant Executive Engineer, Kodigehalli Sub Division, Yelahanka Zone, B.B.M.P. Bangalore.

#42/1, 6th Main Road, Jnanajyothi Nagara, Malathalli, Bangalore – 560 056.Tel: 080-23241948, Fax: 080 - 23240685, Cell : 9964339888 E-mail : mbnk2278@yahoo.com